

## PATENT ABSTRACTS OF JAPAN

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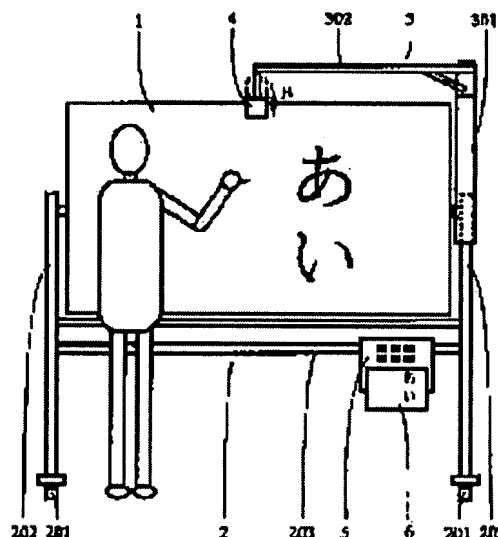
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## (54) ELECTRONIC BLACKBOARD

(57)Abstract:

PURPOSE: To provide an electronic blackboard simple in construction, light in weight and easily movable, which can read and copy an image written on a blackboard/whiteboard.

CONSTITUTION: A camera supporting means 3 for setting an electronic camera 4 so as to be movable to a read position on the front side of a whiteboard 1 and to a non-read position above the whiteboard 1 is mounted to a frame 2 for supporting the whiteboard 1. By using the electronic camera 4 for reading an image, an electronic blackboard simple in construction, light in weight and easily movable can be made.



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**ELECTRONIC BLACKBOARD**

[電子黒版]

**KOMORI SHIGEHIO et al.**

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(54) [Title of the Invention] **ELECTRONIC BLACKBOARD**

(57) Abstract:

PURPOSE: To provide an electronic blackboard simple in construction, light in weight and easily movable, which can read and copy an image written on a blackboard/whiteboard.

CONSTITUTION: A camera supporting means 3 for setting an electronic camera 4 so as to be movable to a read position on the front side of a whiteboard 1 and to a non-read position above the whiteboard 1 is mounted to a frame 2 for supporting the whiteboard 1. By using the electronic camera 4 for reading an image, an electronic blackboard simple in construction, light in weight and easily movable can be made.

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[Claims]

[Claim 1] An electronic blackboard characterized by having a black/white sheet in which write-in elimination of the alphabetic character supported by the frame is possible, a camera support means in which the electronic camera equipped with the image sensor which changes an optical image into an electrical signal was attached, or a black/white sheet which can freely migrate to the reading station by the side of the front of black/white sheet, and the upper non-reading station of black/white sheet, and a printer which copies the image read by this electronic camera.

[Claim 2] The camera support means of Claim 1 is an electronic blackboard.

[Claim 3] The camera support means of claim 1 is an electronic blackboard characterized by making the location of the electronic camera in a reading station into the front of the center top of black/white sheet.

[Claim 4] A camera support means and a printer according to Claim 1 are an electronic blackboard characterized by

making the location of the electronic camera in a reading station into the front of the center of a black/white sheet.

[Claim 5] An electronic blackboard according to Claim 1 is an electronic blackboard characterized by making attachment and detachment freely.

[Claim 6] characterized by having an image storage means to store the image data for one read screen.

[Claim 7] An electronic blackboard according to claim 1 is an electronic blackboard characterized by having a quantity of light adjustment means to amend the quantity of light of image data to homogeneity and characterized by having the floodlighting means which illuminates black/white sheet.

#### [Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to an electronic blackboard which copies images drawn on black/white sheet, such as a graphic form and an alphabetic character.

[0002]

[Prior Art] As a conventional electronic blackboard, firstly the web material prepared was free and could be moved, the image drawn on the web material with the scanner

formed through reading, and there was output of the read image by the printer having moved the scanner along the migration path and secondly was free to move along the flat surface of a feltboard, the image drawn on the feltboard read and what was output as the read image by the printer was known.

[0003]

[Problems to be Solved by the Invention] However, it was inconvenient for a configuration to become complicated since the device to which the web material and this web material of dedication are moved in the 1st conventional electronic blackboard is needed, and for this reason, for weight to also increase and to move it. Moreover, it was inconvenient to equip the scanner itself with a motor etc., in order to make a scanner run by himself in the 2nd conventional electronic blackboard, for a configuration, such as having the rail which this scanner move further along the cross direction of a feltboard, to become special, and for the weight of the whole equipment to also increase.

[0004] The purpose of this invention is based on the above problems and offers a lightweight electronic blackboard easy to make it move with an easy configuration, and even if it uses the well-known blackboard or well-known white sheet still more generally used, it offers the conventional



electronic blackboard and an electronic blackboard which can copy the same clear image.

[0005]

[Means for Solving the Problems] The black/white sheet which the electronic blackboard of this invention can eliminate with alphabetic characters supported by the frame, a camera support means in which the electronic camera equipped with the image sensor which changes an optical image into an electrical signal was attached by the frame, or the black/white sheet free to migrate to the reading station by the side of the front of black/white sheet, and the upper non-reading station of black/white sheet, and it is characterized by having a printer which copies the image read by this electronic camera. Furthermore, a camera support means whether at the location of the electronic camera in a reading station is made into the front of the center top of black/white sheet, or it is desirable to consider as the front of the center of black/white sheet, and it is desirable to carry out to the ability of a camera support means and a printer to be detached and attached. It is desirable to have storage means to store the image data for one screen read, and it is desirable to have the floodlighting means which illuminates the black/white sheet further, and it is desirable to have a quantity of light

adjustment means to, and to make the quantity of light of the image data homogenous.

[0006]

[Embodiment] The embodiment of this invention is explained based on the drawings. Figure 1 is a front view of an electronic blackboard, Figure 2 is a level view of the electronic blackboard, and Figure 3 is a side view of the electronic blackboard.

[0007] The feltboard 1 is supported by the frame 2 with an abbreviated H configuration whose migration enables drawings of an alphabetic character and an image and elimination with the marker and the eraser, and was equipped with the axle-pin rake 201, and was enabled to freely rotate centering on the center section of the both ends, with the well-known 900mm by 1800mm on the common size, and has a frame 2 outside.

[0008] The attachment section 301 which does not illustrate the camera support means 3 in Figure 1 to the vertical section 202 on the right-hand side of a frame 2 and which bound tight and was therefore fixed and in detail, it is constituted by the camera bearing bar 302 which it has so that it might rotate horizontally to this attachment section 301. The electronic camera 4 which reads an image with image sensors, such as a CCD sensor, to the point of

this camera bearing bar 302, and is transformed into an electrical signal has free vertical movement through the sliding mechanism which is not illustrated, and the camera bearing bar 302 is further moved in the direction of Figure 2 with the mark A and an electronic camera 4 moved downward (the direction of arrow-head B). An electronic camera 4 turns to a feltboard 1 in front ahead with a center top of a feltboard 1. In addition, the location of the electronic camera 4 at this time is at a location which can be exactly read to the right-and-left edge of a feltboard 1.

[0009] In addition, if it is at about 170cm since the camera bearing bar 302 at this time and the location of an electronic camera 4 are located at the location of the top face of a feltboard 1 as shown in Figure 1, this will be contacted by the usual activity. A user takes care not to contact this camera bearing bar 302 or electronic camera 4 accidentally beyond what is necessary to move an electronic camera 4 upward (solid flow of an arrow head B), to make the solid flow of the arrow head A rotate the camera bearing bar 302, and just to make it located at the top face of a feltboard 1 with the location of the electronic camera 4 at this time serving as rotation of the feltboard 1 further.

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[0010] It binds tight, and, therefore, is attached and a printer 5 has the actuation function and the copy function which is not illustrated to the horizontal level 203 of the frame 2 of the lower part section of a feltboard 1 and which copies to thermal paper, the injection of a power source, and a setup of the number of copies, and to make the input of a copy of initially and later and modified.

[0011] Figure 4 is a block diagram showing the electric configuration of an electronic blackboard, and the electronic camera 4 consists of the wide angle lens 401 which reads the feltboard 1 completely possible even from the about 1m location, the shutter 402, a CCD sensor 403 of the rectangle made into the same aspect ratio of 1:2 as a feltboard 1 so that it might not read except as a feltboard 1, a stroboscope 404 that is the floodlighting means which illuminates a feltboard 1, and a control section 405 which carries out control of the electronic camera 4 as a whole. In addition, since the image read when this electronic camera 4 was leaning to the optical axis so that it might be suitable in the center of a feltboard 1 is distorted, the feltboard 1 has been read towards the feltboard 1 top only using the lower half of a lens 401 so that it may become perpendicular to the flat surface of a feltboard 1 about an optical axis X.

[0012] The control unit 501 to which the injection of a power source, and a setup of the number of copies, and a printer 5 makes the input of a copy of initiation and modification of copy concentration, the control section 502 which controls a printer 5, and the memory 503 which stores the image for one screen which the electronic camera 4 read, a printer driver 504 and the thermal head array 505 which has a heater element of the number of pixels and the same number of the lengthwise direction of said CCD sensor 403. Furthermore, the amount of non-uniformity of transmitted lights by the difference of the quantity of light which passes through the center of a lens notably seen in a wide angle lens, and the quantity of light which passes one end of a lens, has the operation means 507 which is a quantity of light adjustment means to compute the image data which carried out the quantity of light adjustment from the memory 506 which stores the quantity of light adjustment data which amend the quantity of light nonuniformity which doubled the quantity of light nonuniformity on the feltboard by the stroboscope, and the read image data and quantity of light adjustment data.

[0013] Next, actuation of the electronic blackboard of this embodiment is explained. If a user moves the camera bearing bar 302 in the direction of arrow-head A, an electronic

camera 4 is moved in the direction of arrow-head B, an electronic camera 4 is turned to a feltboard 1 and directions of copy initiation of the image of a feltboard 1 are given from the control unit 501 of a printer 5. First, a stroboscope 404 emits light, it aligns with this and a shutter 402 opens, and by the CCD sensor 403, a feltboard 1 is read. The image data for one read screen is transmitted to a printer 5, and is stored by memory 503. Next, the image data which amended quantity of light nonuniformity with the operation means 407 based on the quantity of light adjustment data stored by this image data and memory 506 is computed, the image data after the computed adjustment is transmitted to the thermal head array 505 through a printer driver 504, and an image is formed in a thermal paper 6.

[0014] It has a storage means 503 to store the image data for one screen read by the CCD sensor 403 and this CCD sensor 403 of the rectangle corresponding to a feltboard 1 in this embodiment, an image can be read with sufficient quantity of light by irradiating a feltboard 1 by the stroboscope 404 in a short time, and by reading an image further for a short time, even if there is some vibration, clear image data without blurring can be obtained. Moreover, since the attachment section 301 and the printer 5 of the camera support means 3 are attached by each fastening which

is not illustrated on a frame 2, and this is loosened, it removes from a frame 2, even another feltboard and an another blackboard carry this, they are attached to an another feltboard and to an another blackboard.

[0015] In addition, the quantity of light adjustment data of this embodiment computes as new the quantity of light adjustment data which make this uniform from the actual quantity of light nonuniformity of the image data read and reads the blackboard and the feltboard first in consideration of the condition of the lighting of a location that the blackboard had stored to ROM a lens and the data for which it asked beforehand from the property of a stroboscope is sufficient as is, and is attached, and the feltboard is installed, and may be stored.

[0016] Figure 8 is a drawing showing the condition at the time of reading of a CCD sensor with the block diagram in which Figure 8 shows the 2nd embodiment of this invention from Figure 5, and Figure 5 shows the front view of an electronic blackboard and Figure 6 shows the side elevation of an electronic blackboard, and Figure 7 shows the electric configuration of an electronic blackboard.

[0017] The attachment section 701 of the pair which does not illustrate the camera support means 7 in this embodiment to the vertical section 202 of right and left of

a frame 2 in Figure 1 and which binds tight and was therefore fixed, in detail, it is constituted by the camera bearing bar 703 of an abbreviated U shape prepared so that it might rotate perpendicularly with the shaft 702 of the attachment section 701 of this pair. When an electronic camera 8 moves the camera bearing bar 703 to the center section of this camera bearing bar 703 until it stops in Figure 5 and the direction of Figure 6 has mark B with a stopper 704, if it is installed so that an optical axis Y may be suitable in the center of a feltboard 1 as ahead of the center of a feltboard 1 shown in Figure 7, and this camera bearing bar 703 is moved to the hard flow of an arrow head B, it is located at the top face of a feltboard 1, and the user is taking care not to contact.

[0018] From the block diagram of Figure 7, moreover, the electronic camera 8 of this embodiment the wide angle lens 801 which makes reading of the feltboard 1 as a whole possible even from a location which approached, The CCD sensor 803 of the shape of line corresponding to the lengthwise direction of the feltboard 1 which moves in parallel with the flat surface of a feltboard 1 along with a shaft 802, the control section 804 which controls an electronic camera 8, and the memory 805 which stores the image data read by the CCD sensor 803, it consists of



quantity of light adjustment filters 807 which double and amend the stroboscope 806 which is a floodlighting means to irradiate a feltboard 1, and the amount of nonuniformity of transmitted light of a lens and the quantity of light nonuniformity by the stroboscope is known. The control unit 901 to which the injection of a power source, a setup of the number of copies, and a setup of the copy range, and a printer 9 makes the input of a copy for initiation and modification with copy concentration, is constituted by the control section 902 which controls a printer 9, memory 903, the printer driver 904, and the thermal head array 905 equipped with the heater element of the number of pixels and the same number of said CCD sensors 803. /3

[0019] Next, actuation of the electronic blackboard in the 2nd embodiment is explained. If a user moves the camera bearing bar 703 in the direction of arrow-head B, an electronic camera 8 is turned to a feltboard 1 and directions of copy initiation of the image of a feltboard 1 are given from the control unit 901 of a printer 9, as shown in Figure 8, the CCD sensor 803 moves in the direction of arrow-head D along with a shaft 802, it will migrate with this CCD sensor 803, multiple-times luminescence of the stroboscope 806 will be carried out, quantity of light nonuniformity will be amended by the

quantity of light adjustment filter 807, and reading of an image will be performed. If the read image data is stored once by memory 805 and the image data for one screen is stored, the image data of memory 805 will be read with the instruction of a control section 903, it will be transmitted to the thermal head array 905 through a printer driver 904, and an image will be formed on thermal paper 6.

[0020] In addition, as it enables it to have changed the copy range of whether the same aspect ratio 1:2 as a feltboard 1 copies in the 2nd embodiment, or it copies in the general A-th edition size, therefore is shown in Figure 8 when copying the feltboard 1 as a whole, moving the CCD sensor 803 between F out of the E drawing, and the feltboard 1 as a whole is read. When copying in the A-th edition size, the CCD sensor is moved 803 between G and H, and tries to read only the center section of the feltboard 1 corresponding to the A-th edition size.

[0021] Moreover, it is made in the 2nd embodiment to have a quantity of light sufficient by aligning with reading of an image and making a stroboscope 806 emit light for reading, therefore even if it carries out the reading rate of the CCD sensor 803 early, a clear image is obtained, and it is considered as a configuration strong against image blur by vibration by reading further and carrying out a rate early.

The location of an electronic camera 8 by furthermore, is made to counter the center section of the feltboard 1, since a lens 801 can be used in the range large as a whole and unlike the 1st embodiment it can read, even if it makes the location of an electronic camera 8 into a near location by the feltboard 1. Therefore, since it can read even if it shortens a camera bearing bar, it can perform as a small lightweight version of the electronic blackboard and it does not use the edge of a lens 801 further, the amount nonuniformity of transmitted lights becomes small, and can stop the extent of quantity of light adjustment.

[0022] Moreover, although the quantity of light adjustment filter for making the quantity of light of image data into homogeneity, and reading it is prepared on a lens side and it corresponds in the 2nd embodiment, such a quantity of light adjustment filter may be prepared on a stroboscope side.

[0023] In addition, what is necessary is to make it attach to the left-hand side vertical section 202, to change whenever changing-angle of the electronic camera 4 to the camera bearing bar 302 in this case, and just to make it the optical axis of an electronic camera 4 turn to a feltboard 1 in the 1st embodiment, although the attachment section 301 of the camera support means 3 which supports an

electronic camera 4 is attached in the vertical section 202 on the right-hand side of the frame 2 of a feltboard 1. Moreover, although the feltboard 1 which can rotate freely is used to a frame 2 in both the embodiments, it is not restricted to this, a blackboard may be used and it may be fixed to a frame. In addition, the attachment section of the camera support means in the case of using fixed black/white sheet to a frame may be attached to the edge of a feltboard 1 direct picking.

[0024]

[Effect of the Invention] Compared with the conventional electronic blackboard, since the electronic blackboard in this invention uses an electronic camera for reading of an image, this electronic camera is further located in black/white sheet at the front side at the time of image read and it was made to locate above the black/white sheet at the time of non-reading with no lightweight object with an easy configuration for which it is easy to make it move, and a user touches an electronic camera in error at the time of non-reading. It can consider as the optimal location optically by being able to avoid becoming troublesome also at the time of non-read by reading, and furthermore making the location of the electronic camera at the time into the front of the center top of black/white

sheet, or making the location of the electronic camera at the time of reading into the front of the center of black/white sheet. Moreover, it can be used by making a camera support means and a printer removable to black/white sheet, being able to attach to the existing black/white sheet. Moreover, by having storage means to store the image data for one screen, an image is read, and little reading of image blurring can be performed and it completes in a short time. Moreover, while obtaining a quantity of light sufficient by having a floodlighting means, an image can be read more in a short time, and having an image freer of blurs means copying can be performed. Moreover, by having the quantity of light adjustment means, the whole black / white sheet can be read with a uniform quantity of light, and an image of uniform concentration can be obtained.

[Brief Description of the Drawings]

[Figure 1] The front view of an electronic blackboard

[Figure 2] The top view of an electronic blackboard

[Figure 3] The side elevation of an electronic blackboard

[Figure 4] A block diagram showing the electric

configuration of an electronic blackboard

[Figure 5] The front view of the electronic blackboard in other embodiments

[Figure 6] The side elevation of the electronic blackboard in other embodiments

[Figure 7] A block diagram showing the electric configuration of the electronic blackboard in other embodiments

[Figure 8] Drawing showing the condition at the time of reading of a CCD sensor

[Explanation of the Elements]

1 Feltboard

2 Frame

3 Camera Support Means

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301 Attachment Section

302 Camera Bearing Bar

4 Electronic Camera

401 Lens

403 CCD Sensor

404 Stroboscope (Floodlighting Means)

5 Printer

507 Operation Means (Quantity of Light Adjustment Means)

6 Thermal Paper

7 Camera Support Means

701 Attachment Section

703 Camera Bearing Bar

8 Electronic Camera

801 Lens

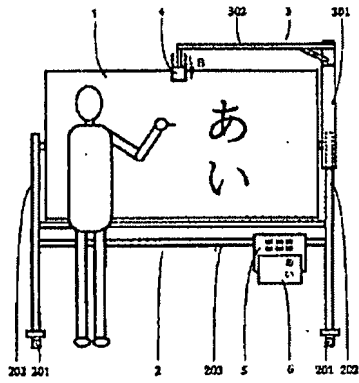
803 CCD Sensor

806 Stroboscope (Floodlighting Means)

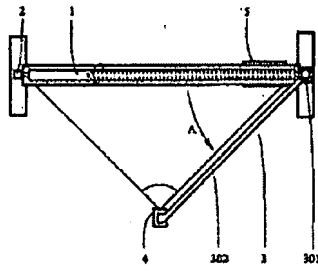
807 Quantity of Light Adjustment Filter

9 Printer

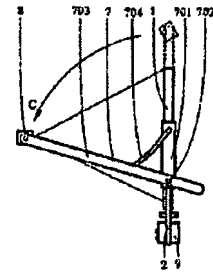
【図1】



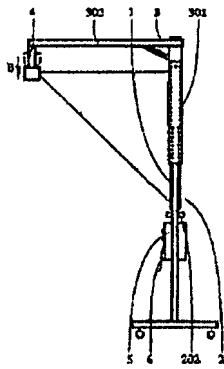
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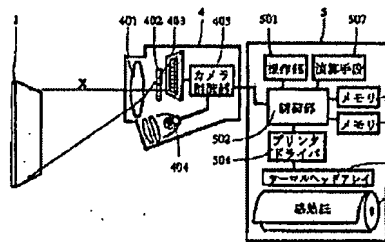
【図6】



【図3】

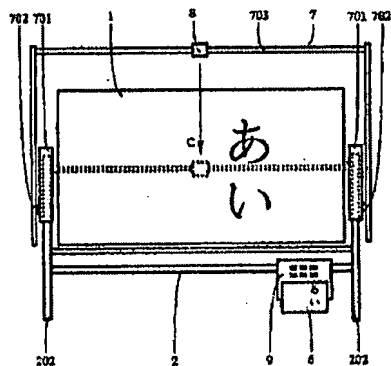


【図4】

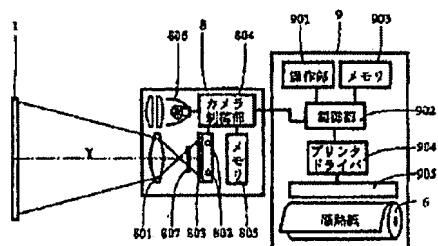




【图5】



【圖7】



【图8】

